ENTOMOLOGICAL NEWS

MARCH 1954

Vol. LXV **No. 3**

CONTENTS

Rehn—Distribution centers 57

Chamberlin—A new milliped genus 65

Dillon—Preparing insects for sectioning 67

Tuxen—On "A brief history of entomology" 71

Frost—New name for Phytomyza subpusilla 73

Judd—Dicymolomia and its parasite 73

Current Entomological Literature 75

PUBLISHED MONTHLY, EXCEPT AUGUST AND SEPTEMBER, BY
THE AMERICAN ENTOMOLOGICAL SOCIETY
PRINCE AND LEMON STS., LANCASTER, PA.
AND
1900 RACE STREET, PHILADELPHIA 3, PA.

Subscription, per yearly volume of ten numbers: $5.00 domestic; $5.30 foreign; $5.15 Canada. Entered as second-class matter April 19, 1943, at the post office at Lancaster, Pa., under the Act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for in paragraphs (d-2), Section 34.40, P. L. & R. of 1948, authorized April 19, 1943.

ENTOMOLOGICAL NEWS

ENTOMOLOGICAL NEWS is published monthly, excepting August and September, by The American Entomological Society at Prince and Lemon Sts., Lancaster, Pa., and the Academy of Natural Sciences, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

PHILIP P. CALVERT, Editor Emeritus. R. G. SCHMIEDER, Editor. Editorial Staff: E. J. F. MARX, V. S. L. PATE, M. E. PHILLIPS, and J. A. G. REHN.

Subscription price, per yearly volume of 10 numbers: Domestic, $5.00; Foreign, $5.30; Canada, $5.15—U. S. Currency.

SUBSCRIPTIONS: Communications and remittances to be addressed to **Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

ADVERTISEMENTS: Rate schedules available on request. Address, **Fred B. Jacobson, Advertising Manager, Entomological News, 1900 Race Street, Philadelphia 3, Pa.**

MANUSCRIPTS and all communications concerning same should be addressed to **R. G. Schmieder, Zoological Laboratory, University of Pennsylvania, Philadelphia 4, Pa.**

The receipt of all papers will be acknowledged and, if accepted, they will be published as soon as possible. If not accepted, authors will be so advised and postage requested for return of manuscripts. Articles longer than six printed pages may be published in two or more installments, unless the author is willing to pay for the cost of a sufficient number of additional pages in any one issue to enable such an article to appear without division.

ILLUSTRATIONS. Authors will be charged as follows: For text-figures, the cost of engraving; for insert plates (on glossy stock), the cost of engraving plus the cost of printing. The size of text-figures or plates when printed must not exceed 4 x 6 inches.

All blocks will be sent to authors after publication. It is not advisable to print half-tones as text-figures.

TABLES: Authors will be charged the setting of all tables exceeding 2 inches in height.

SEPARATA: Twenty-five extras of an author's contribution will be given free. They will be "run of form," without removal of extraneous matter, folded but not bound, uncut and without cover.

Authors wishing more than the 25 separates must so advise the Editor or the printer. See bottom of this page. The Editor requests that authors state the number of separates desired in a letter accompanying their manuscript.

SEPARATES of articles without covers, without extraneous matter, will be furnished by the printer at the following prices: 1–4 pages, 25 copies, $3.13; 50 copies, $3.13; 100 copies, $3.75. 5–8 pages, 25 copies, $5.00; 50 copies, $5.00; 100 copies, $5.94. 9–12 pages, 25 copies, $7.81; 50 copies, $7.81; 100 copies, $9.06. Covers: first 50, $3.44; additionals at .025 cents each. Plates, printed on one side: first 50, $2.50; additional at 0.188 cents each. Transportation charges will be extra. THE LANCASTER PRESS, INC., Lancaster, Pa.

ENTOMOLOGICAL NEWS

VOL. LXV MARCH, 1954 No. 3

The Distribution Centers of the Melanoplini (Orthoptera; Acrididae; Cyrtacanthacridinae)

By JAMES A. G. REHN, The Academy of Natural Sciences of Philadelphia

Since the days of Eduard Suess it has been orthodox to ascribe to an Angaran center the role of a *locus communis* for an overwhelming percentage of the elements of the Holarctic biota. While in many cases this may, and probably does, provide an explanation of what has taken place, in others, where it has been assumed to be a basic postulate which perforce must be accepted, this theory can have value only if it is supported by the weight of known evidence.

In vertebrate paleontology this type of evidence is now so increasingly comprehensive that those who consider faunistic histories or movements in any group, must acquaint themselves with at least some of the broad conclusions which have been drawn, particularly in the past few decades, from the steadily augmenting amount of mammalian evidence. While it has long seemed fashionable to ascribe a very secondary role to the Nearctic region as a biotic evolutionary center, and to credit the Palearctic with a markedly predominating one in the evolution of the Holarctic biota, this latter is occasionally refuted by fossil evidence. The migrations of whole groups of mammals, or their regional extinction, are, as with the camels and tapirs, sometimes made clearly evident by this record. Admittedly this mammalian evidence is almost entirely Caenozoic in coverage, and in considerable part late Caenozoic, but many tribes of insects are probably no older, and it is important for all ento-

mologists who discuss faunal histories to consider what fellow-workers have ascertained in regard to other animals. Also, when we have little or no fossil evidence for the group from which to reason, we must turn to our knowledge of the existing fauna, and see what we may learn from it.

To digress momentarily, however, in the constant stressing of the role of Angara in biotic history, little attention is given to that similarly ancient, and much larger, part of North America called Laurentia by geologists. To quote Suess himself:[1] "That vast region of North America which is formed of ancient rocks overlain by horizontal Cambrian sediments has received the name of Laurentia. It comprises the whole of the Canadian shield, but if we are to regard it as a tectonic unit, we must include the whole of the flat-bedded superstructure up to some natural boundary. Such a boundary is presented by the Rocky Mountains, the United States chain, and, for nearly their whole length, the Appalachians also. The Colorado plateau, a fragment of table land, bounded on the east by the southern branches of the Rocky Mountains, ought also, perhaps, be regarded as a part of Laurentia." Further (p. 257) he adds: "Laurentia extends from south Texas to the Arctic Ocean through 53 or 54 degrees of latitude, and from the mouth of the Mackenzie to the east coast of Greenland through more than 110 degrees of longitude. . . . Laurentia is a very ancient unit. *It behaves towards all the younger folds as a foreland* [his italics]."

Of the Nearctic acridid fauna the most numerous in species, and often so areally in individuals of different species as well, is the tribe to which the name Melanoplini has warrantedly been applied.[2] Long known as the Podismae (or Podismini), from one of its Old World genera, which is also now found to have a single representative in the Nearctic Region (*P. hesperus* (Hebard)[3]), this assemblage has, in the Old World, components distributed over Eurasia from western Europe to China, Korea and Japan, and from subarctic districts to the mountains of

[1] "The Face of the Earth" (English translation of the classic "Das Antlitz der Erde"), IV, pp. 251 and 257.

[2] See ROBERTS, Proc. Acad. Nat. Sci. Phila., XCIX, p. 202 (1947).

[3] See REHN and REHN, Trans. Amer. Entom. Soc., LXV, p. 88 (1939).

southern Europe, the Himalayas, Formosa and Tonkin. Within this great area it breaks up into a number of genera, although it is also unrepresented over extensive sections of the Palearctic Region, and apparently does not penetrate peninsular India, Burma or Indo-Malaya, and in Indo-China reaches only to Tonkin. All we know of the paleontological history of the tribe is that two existing species, representing two genera (*Miramella* and *Bohemanella*), occur in the Pleistocene of Starunia, in the Polish Carpathians.[4]

In the New World we find members of the Melanoplini extending over a far greater extent of latitude than in the Old World, from the Arctic Circle to at least south-central Argentina and Chile, or well over one hundred degrees of latitude, reaching upwards to arctic alpine or paramo conditions in the Rocky Mountains, the Sierra Nevada, the great Mexican volcanoes, the main Andes, the Sierra Nevada de Santa Marta of Colombia and in the Venezuelan Andes. The sole area in the hemisphere, within these bounds, where they are unrepresented is the Amazonian lowland, an area where numerous other groups, elsewhere widely distributed in South America, are also absent. While as yet not critically studied and hence unreported the tribe is also represented by brachypterous material in my hands from mountain areas of certain of the Greater Antilles. This last fact, alone, is conclusive evidence that their arrival in Antillia was by no means recent. In North America members of the tribe are present virtually everywhere south of the Arctic barren grounds, even in the most extreme deserts and also under arctic alpine conditions, thus exhibiting in that part of the world an adaptability which predicates long association and adjustment, even where it has meant retreat and advance over the greatest area in the world now exposed which was subject to repeated Pleistocene glaciation. In passing it may be pointed out that no Palearctic member of the Podismini is known to occur in true deserts.

The distinguished French orthopterist Dr. Lucien Chopard, in

[4] See ZEUNER, Starunia, 3, pp. 9–11 (1934); Ann. and Mag. Nat. Hist. (11) VIII, p. 513 (1941).

his classic work on the biology of the Orthoptera,[5] dismisses the origin of *Melanoplus*, the dominant North American genus of the Melanoplini, with the following: "il semble certain que le premier [i.e., *Melanoplus*] est d'origine asiatique." In an earlier study [6] Chopard had reached certain conclusions regarding the development of centers of speciation of that genus in the United States which, unfortunately, do not correctly interpret the evidence he was summarizing, this latter very largely drawn from the researches of certain contemporary American orthopterists, of whom the writer was quoted as one. This aspect of the subject will be commented upon elsewhere.

In the Old World we find the Melanoplini showing marked radiative or development centers in the following areas: (1) the Pyrenees and other mountains of Spain, the Alps, the Italian mountains, the Carpathians and the mountains of all of the Balkan Peninsula and Greece; (2) the Caucasus; (3) the Amur (or Ussuri) region of eastern Siberia, the mountains of China, Japan, Formosa and the Himalayas. Glaciation was undoubtedly a factor which made certain of these various component districts subsidiary evolutionary centers. While species occur in the intervening territories, the above mentioned units would appear to be the centers of marked diversity or most pronounced individuality of types. No member of the tribe occurs in the Palearctic portion of Africa or in Iran, while representation in Anatolia is very limited.

In the New World there are three comparable major evolutionary centers for the Melanoplini, between each of which are areas where the tribe is sparsely represented, but, as already stated, it is absent, within the overall encompassing boundaries, only from the markedly tropical lowlands of Amazonia. The first of these evolutionary centers covers Canada (with Alaska), the United States and Mexico north of the Isthmus of Tehuantepec. The second is in the Venezuelan Andes and adjacent,

[5] "Le Biologie des Orthoptères." By LUCIEN CHOPARD. Paris. 1938. [Reference is made to page 14.]

[6] "La faune des Orthoptères des montagnes des Etats Unis et ses rapports avec la faune palearctique." Société de Biogéographie. Paris. 1928. 8 pp.

chiefly montane, areas in northern and eastern Colombia. The third covers that portion of South America from approximately 15° south latitude southward to south-central Argentina and Chile, with certain elements reaching somewhat to the northward in the Peruvian and Ecuadorian Andes. But two genera bridge the gap in Central America, these being *Aidemona* and *Trigonophymus,* the former of which ranges from the southwestern United States to Colombia, while the latter is an intrusive type from its area of maximum development in southern South America. Our knowledge of the geological and hydrographic history of Central America makes reasonably clear why this break is present, and which *Aidemona,* clearly from the north, and *Trigonophymus,* as certainly from the south, have crossed possibly in late Caenozoic times. The geological history of northeastern Colombia and northwestern Venezuela is complex, and has been summarized by Schuchert.[7] The relative antiquity of the tableland of eastern and central Brazil is well known, and its probable role as a radiative evolutionary center for the third, more austral, aggregation is a logical conclusion.

Analyzing the recognized generic components of the Melanoplini we find that 27 genera occur in Eurasia, of which one is regarded by Ramme as a synonym of another so included, and of these three, i.e., *Podisma, Zubovskya* and *Bohemanella,* are also present in the Nearctic, while from the Nearctic and the Neotropical together we know at present 59 genera, of which but three—above-mentioned—also occur in the Old World. Only *Aidemona, Trigonophymus* (but two species outside of the most southern center [8]) and *Propedies* (but one species outside the same area [9]) occur in more than one of the three radiative areas above outlined, and of these *Trigonophymus* is the sole one present in all three, and in the largest and most impor-

[7] "Historical Geology of the Antillean-Caribbean Region." 1935. [Pages 624–695 treat of Colombia and Venezuela.]

[8] *T. punctulatus* and *T. notatus,* the former reaching northward to Costa Rica, the latter solely Mexican.

[9] *P. minutus* Roberts, from Curaçao. The latter island is regarded as part of the Coast Range or Caribbean Andes of northward Venezuela. See Schuchert, idem, p. 678.

tant of these it occurs only in the mountains of central and southern Mexico. Turning to the number of species and subspecies known, as a possible index to evolutionary complexity, and conservatively basing the count on those now regarded as valid by workers most familiar with the respective faunas, we find a maximum of 83 species or subspecies in the Palearctic Region, while the Nearctic and Neotropical representation comprises at least 471 species or subspecies.

In the Palearctic and impinging Oriental regions we find definite localization of most of the genera, with the largest numbers of these found in what may roughly be termed the Mediterranean-Alpine-Balkan montane center (6 genera), northeastern Asia with Korea and Japan (6), southeastern Asia (exclusive of the Himalayan subregion) (6) and the Himalayas and the Caucasus each with 2 (these endemics). Those of relatively broad distribution in the Palearctic are few (4), and, of these, two (*Podisma* and *Bohemanella*) are shared with the Nearctic. However, there is no single area in the Palearctic Region, even of great size, which could be regarded as the outstanding evolutionary center of the Melanoplini, on the basis of number of genera or of species or subspecies there occurring at present. The greatest diversity specifically is found in the Mediterranean-Alpine-Balkan center, but the number of genera there represented is relatively low (vide supra).

In the New World 40 genera occur north of the Isthmus of Tehuantepec, this total exclusive of three shared with the Old World and two with areas to the southward; the Colombian-Venezuelan center has four genera plus *Propedies* which it shares with more austral America and *Aidemona* and *Trigonophymus* with more northern regions; while the Brazilian-Argentine center holds eight peculiar genera plus *Propedies* shared with the Colombian-Venezuelan one, and *Trigonophymus* with both of the other New World centers. Samplings of the number of genera present in representative areas of the North American-Mexican center alone give us the following figures: New Jersey and Pennsylvania 6, North Carolina 5, Florida 6, Montana 7, Colorado 8, Texas 13, Washington and Oregon 8,

California 7, Arizona 7. The number of individual genera involved in these sample tabulations (all within the United States alone) totals 32, or five more than all known from the entire sweep of Eurasia.

It is conceivable that genera such as *Podisma* and *Zubovskya* have entered the Nearctic from the Palearctic at a relatively recent period, and the same may be true of the Nearctic *Prumnacris, Buckellacris* and *Nisquallia,* while *Bohemanella,* the single component of which was long considered a *Melanoplus,* may have similarly crossed the Bering land-bridge but in the reverse direction (i.e., from the Nearctic). On the other hand *Zubovskya* was clearly in North America before the Pleistocene, as its present discontinuous distribution on that continent unquestionably points to glacial ice-sheets as the agency separating the eastern and western sections of its North American distribution.[10] It is also within the realms of possibility that the eastern Asiatic forms of *Zubovskya* (all known from the Palearctic) are not the parent stock, but instead are intrusives from the New World, where the genus is present over a far greater area. Clearly *Bohemanella* has been derived from one of the montane lines of the genus *Melanoplus,* to which it is exceedingly close if actually distinct generically. None of the other very considerable representation of melanoploid genera in the New World shows any very close resemblance to Old World ones, and we are forced to the conclusion that their evolution has taken place in the New World, and that while migration and countermigration may have taken, and probably did take, place the limited Old World representation certainly cannot be considered the parent stock, or that area the evolutionary center of the whole, in view of the disparity in the development of the tribe in these two great areas.

It is hardly conceivable that evolutionary centers such as that in the southern half of South America have developed in a relatively short period of time from a parent one as distant as east-central Asia (i.e., Angara), particularly where we consider the degree and extent in time of the isolation which tropical America

[10] See REHN and REHN, Trans. Amer. Entom. Soc., LXII, p. 8 (1936).

(i.e., south of Tehuantepec) is known to have had.[11] Instead it seems much more logical and warranted to regard the Melanoplini as a basic New World entity, probably developing rather early in North America, where by far its greatest complexity is found today, the South American centers being established subsequently during certain of the periods of connection with North America.[12] The isolation of the two South American centers from one another is understandable from the viewpoint of Andean orogeny and the development of the great Amazon basin as a barrier to certain forms of life. The presence in North America of genera not widely removed from some of those of the Palearctic Region can as well be interpreted through a westward movement of their progenitors as the usual assumption that the reverse was true. This we know from fossil evidence has taken place in a number of the higher forms of animal life.

To summarize, in the New World we have 59 genera and, conservatively evaluated, 471 species and subspecies of the Melanoplini, these found over a great range of latitude and including almost all possible conditions, or from above the Arctic Circle to about 41° south latitude, and from below sea-level (in parts of California) to arctic alpine summits sometimes bordering perpetual snow (in Washington and Oregon), and from the Atlantic to the Pacific coasts. Three major centers of New World radiative evolution are evident, the separation of which is due to their geological backgrounds. The absence of members of the Melanoplini from areas of the Palearctic, such as North Africa, Iran and much of Anatolia, would indicate that the tribe was not present when these areas received most of their other orthopteran elements of undoubted Palearctic origin. The fact that many, in fact most, of the Palearctic Melanoplini are montane does not militate against this argument, as montane areas

[11] Except for Lower Oligocene times this isolation is regarded by Schuchert as having been continuous from the Upper Eocene to at least the Lower Pliocene. See SCHUCHERT, "Historical Geology of the Antillean-Caribbean Region," maps 10 to 16.

[12] For a careful and critical analysis of this latter question in its Caenozoic aspect the reader is referred to SIMPSON, G. G., 1950, "History of the Fauna of Latin America," American Scientist, XXXVIII, pp. 361–389, 10 figs.

are, and long have been, definite features of the apparent regional centers of the Old World, and in the Palearctic regions mentioned where the Melanoplini are absent purely montane species represent other groups of insects. On the other hand in the Nearctic they apparently occupied, and still occupy, almost every type of environment, persisted through the sweeping Pleistocene glaciations, and there developed into one of the most highly diversified existing tribes of the Acridoidea. To disregard the evidence of an existing fauna of remarkable complexity—clearly not a development of a short period of time—is hardly justifiable today. Much of the manner of thought which failed to grasp the obvious conclusion here reached, has been due to an absence of first-hand acquaintance with the elements of some of the faunas involved, and a lack of knowledge of the very broad adaptability to almost all types of environments found in many of the Nearctic Melanoplini. A personal comprehension of the field conditions under which all but two of the Nearctic genera live has enabled me to approach this problem with an open mind. It has been my privilege to study either in the field or in the laboratory, or in both, all the genera and all but a very limited number of the species or subspecies of Nearctic and Neotropical Melanoplini, and as laboratory material all but a few of the genera and the majority of the species of the same known from Eurasia.

A New Milliped of the Genus Cylindrodesmus from Palmyra Island

By Ralph V. Chamberlin, University of Utah

In a small but interesting collection of chilopods and diplopods collected in Hawaiian and other Pacific islands were specimens of a new species of the genus *Cylindrodesmus* taken on Palmyra Id. in 1948. These and the other specimens of the collection were made by N. L. H. Krauss, through whose courtesy I have been privileged to study the material. The species here described makes the third to become known in *Cylindrodesmus,* the others being *C. hirsutus* Poc., the genero-

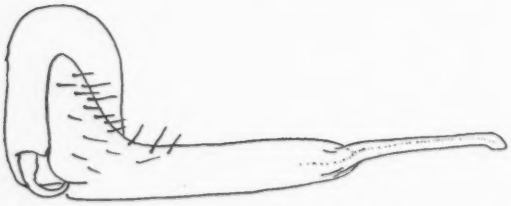

FIG. 1. *Cylindrodesmus palmyrae* n. sp. Right gonopod of male, ventral aspect.

type which is native to Java and other East Indian islands, and *C. villosus* Poc. of Rotuma. In addition Dr. Schubart records what he regards as a distinct variety of *C. hirsutus* from Brazil.

Cylindrodesmus palmyrae new species

Body moniliform, the prozonites being conspicuously less in diameter than the metazonites. The metazonites convex both antero-posteriorly and transversely. Head above and in front with the typical clothing of dense, short hairs, laterally with some longer ones. Metazonites clothed with the usual very short hairs as well as more sparsely with the typical longer setae. Cauda in dorsal view subtriangular, with the caudal end bluntly rounded.

The general color of the body dull, or slightly brownish yellow, the color uniform, the head and caudal segments not abruptly darker, chestnut, as these parts are in *hirsutus;* legs a brighter yellow.

In contrast with the gonopods of the male in *hirsutus,* in which the blade of the telopodite is evenly curved and gradually narrowed to the distal end, the telopodite in the present species presents a long, thicker proximal division, which in ventral view is straight, and an abruptly narrower distal portion which curves ventrad and then cephalad. For details see the accompanying figure.

Segments of the male, 19, of the female, 20.

Length 5 mm., being thus smaller than the usual specimens of *hirsutus.*

Locality. PALMYRA ISLAND. 27 specimens taken by N. L. H. Krauss in February, 1948. The types are in the author's collection.

Some Notes on Preparing Whole Insects for Sectioning [1]

By LAWRENCE S. DILLON,[2] A. and M. College, College Station, Texas

The ordinary run of insects have always presented many difficulties in the preparation of whole specimens for sectioning. While standard procedures have yielded quite satisfactory results with such soft-bodied forms as grubs, caterpillars, plant lice, and the like, they do not do so with even those relatively pliable types, such as flies and bees, let alone bugs and beetles. Consequently, when it became imperative that serial sections of whole bees be prepared, special techniques had to be sought out. The author was fortunate in developing a procedure whereby bees, softer beetles like Melyrids, and even the large black horsefly (*Tabanus atratus*) could be sectioned. Nothing he could find enabled him to section the adult weevils, dung-beetles, or the like.

FIXATION

Of the several fixatives tried, Gilson's fluid proved the most satisfactory. When it was employed on such insects as bees, flies, and melyrid beetles, the specimens remained pliable during the entire procedure, whereas in Bouin's, Zenker's, Hardy's, formalin, and Flemming's W.A. + 0.9% sodium chloride, the exoskeleton tended to become quite hard or brittle. With larger specimens, fixing was quite frequently carried out *in vacuo* with

[1] This study was in part supported by a grant-in-aid from the National Science Foundation for research on honeybee nutrition under the general direction of Mr. Nevin Weaver.

[2] The writer is indebted in many and various ways to the following persons: Dr. V. A. Little, Mr. M. Price, and Mr. N. Weaver, of the Department of Entomology, and to Dr. Sidney Brown, of the Biology Department, who made his vacuum oven and other equipment available.

good results. However, the longitudinal dorsal muscles of the thorax often showed a tendency to contract and break free of their anterior attachment; whether this was a result of the vacuum treatment, improper fixation, or of subsequent treatment has not been ascertained.

Although Gilson's has proven most advantageous for use on adult forms, grubs, caterpillars, maggots, and similar soft-bodied creatures are best fixed in Bouin's, where the slight hardening effect aids in maintaining the exoskeleton in more nearly its original shape. Fairly high vacuum (28 inches) applied during the process aids penetration, but caution must be exercised in reducing the pressure, otherwise the specimens may explode.

Dehydration

The attempt was made to avoid as far as possible all reagents known to have a hardening affect on chitin, such as higher concentrations of ethanol, xylene, and the like. Consequently, Stiles' procedure, utilizing n-butanol in place of higher concentrations of ethanol, was followed, with good results. This subsequently was found to be improved considerably by the addition of phenol, to the extent of 4%, to each step in the dehydration process, except the second, with which it was poorly miscible. With some considerable latitude, the following schedule was followed: 35% ethanol, 30 minutes; 9 parts of 45% ethanol + 1 part of n-butanol, 2 hours; 8 parts of 60% ethanol + 2 parts of n-butanol, 2 hours; 6 parts of 80% ethanol + 4 parts of n-butanol, 4 hours; 4 parts of 95% ethanol + 6 parts n-butanol, 6 to 24 hours; 2 parts of 95% ethanol + 8 parts n-butanol, 6 to 24 hours.

On several occasions the procedure recommended by Murray (1937) was tried, where phenol and chloral hydrate warmed together in equal parts are used for dehydration (12–24 hours), following fixation first in 10% formalin solution + 0.8% sodium chloride and secondly in Gilson-Carnoy. However, results were disappointing as the specimens displayed considerable shrinkage and hardening; vacuum treatment gave no improvement in these regards.

Clearing, Embedding, and Sectioning

For clearing, a-terpineol was by far the most satisfactory, showing no apparent hardening effects on the exoskeleton. Following butyl alcohol dehydration, it was employed in three mixtures with n-butanol: 1 part of n-butanol + 1 part terpineol; 1 part butanol + 2 parts terpineol; 1 part butanol + 3 parts terpineol; and terpineol, three changes. About 1 hour was given in each step. This reagent was found, however, to possess one distinct flaw; it was difficult to remove from the body cavity. Even after embedding in melted paraffin in a vacuum oven held at 28 inches and 65° for 72 or more hours, it was found in objectionable amounts within the wax and body spaces. Consequently, toluol and toluol-wax was tried following clearing and, proving satisfactory, was incorporated into the procedure.

During the warm months in the environs of the laboratory where this study was carried out, it proved highly advantageous to employ high-melting paraffin or similar waxes; lower melting-point waxes have shown neither advantages nor disadvantages during the cooler periods. After placement of the specimens in pure wax, however, it was found highly beneficial to maintain them at sufficiently high temperatures under vacuum, a vacuum oven being employed for the purpose. A temperature of 65° and a vacuum of 28 inches were usually maintained for at least 24 hours and sometimes somewhat longer, depending upon the size and hardness of the insect.

Before embedding could be considered complete, after the wax had thoroughly hardened, it was essential that all bubbles that were present be removed by means of hot needles. Especially was it requisite to remove the film of vapor that frequently continued to adhere to the exoskeleton despite the vacuum treatment. This was usually performed under a dissecting microscope so that the tiniest bubble could be detected. Likewise, when the ribbons were being prepared, if any bubbles became apparent within the insect, sectioning was discontinued until the space had been filled and the fresh paraffin had become quite hard. For it was found that a film of vapor on the body surface

would prevent the wax from gripping it tightly so that the tissue would tear out or drop out during or following sectioning. Cavities within the body encourage tearing in addition.

When due caution had been exercised, it was possible to section down to 7 μ in thickness without undue compression. Sections of greater thinness were not at all satisfactory; however, for general histological purposes, 7 to 10 μ seemed to serve quite well.*

Hydration, Staining, etc.

Following sectioning, any standard procedure served well. As the specimens cannot be freed of contamination from the fixative in the whole state, it is necessary that they be treated with iodine or lithium carbonate in appropriate solutions before staining. As Gilson's was most commonly employed, iodine was added to the 70% alcohol and sometimes also to the 50% when large numbers of slides were being handled.

For staining, Mallory's gave excellent results with good contrast between tissues. In using this stain, sections were left in solutions 1 and 2 for periods of two and four minutes respectively. Destaining proceeded very rapidly and had to be watched closely, for the sections became totally bleached in short order.

References

Larbaud, Mlle. 1921. Nouvelle technique pour les inclusions et les préparations microscopiques des tissus végétaux et animaux. C. R. Acad. Sci. Paris 172: 1317–1318.

Margolena, L. 1932. Concerning dehydrating agents for paraffin embedding. Stain Tech. 7: 25.

Murray, J. A. 1937. Technique for paraffins sections of formol-fixed insect material. Journ. Roy. Micro. Soc. (3), 57: 15.

Stiles, K. A. 1934. Normal butyl alcohol technic for animal tissues with special reference to insects. Stain Tech. 9: 95–100.

* Ed. Note: Dr. A. G. Richards tells me that a static eliminator is most useful in facilitating thin sectioning of insects. Such eliminators remove static by bombarding the knife and specimen block with alpha particles (and are harmless to the operator). The ribbons of any usual thickness (1 to 10 μ) just float down across the knife instead of crumpling at the edge or buckling. Convenient forms of alpha emitters are currently available from most of the large supply houses.—R. G. S.

Herbert Osborn: A Brief History of Entomology.* A Warning

It is often regretted that the U.S.A. and Europe know too little of each other. The above-mentioned book is a piece of evidence as to one side of this saying. The author shall not be blamed because to him "the origin of entomological societies is still a mystery" or for not knowing "when the teaching of Entomology began," but he certainly should have known more about his own period. I shall confine myself to a small selection of statements relating to the Scandinavian countries.

p. 24–28: The Danish, the Norwegian, and the two Finnish entomological journals are missing.

p. 36: "The Swedish collections . . . include probably what has been preserved of his (Linnaeus') original material, though it is said that his first private collection was sold to the British Museum."

All Linnaeus' collection was sold by his widow not to the British Museum, but to a Mr. Smith from whom it came to the Linnean Society, London. In Sweden only insects determined by him in other collections exist.

p. 36: "There (in Sweden) are type specimens perhaps of Fabricius, but Fabrician types are mainly in Kiel. Some said to be in Copenhagen." By far the greater part of Fabricius' types are in Kiel and Copenhagen, half at each place. None in Sweden.

* Ed. Note: The full title is: A Brief History of Entomology, including time of Demosthenes and Aristotle to modern times, with over five hundred portraits. Pp. 1–303, pls. 1–58. The Spahr & Glenn Company, Columbus, Ohio, 1952. The first part has chapters on Entomology in Commerce and Industry, Classification, Economic Entomology, and Medical Entomology. Part II, Regional Entomology, takes up 17 different countries or regions. Part III gives life sketches of many entomologists, and portraits of 522 of them. The portraits go back as far as Redi and Malpighi but include also many of the present-day leaders, with Americans the best represented.—R. G. S.

p. 114: J. C. Schiødte is mentioned only as a teacher of forest entomology. Actually, as keeper of the entomological department of the Zoological Museum, Copenhagen, his main work is taxonomic besides his fundamental descriptions of beetle larvae.

p. 116: "Systema Naturae. The edition of 1758 is usually taken as the date for recognition of species he described or the date on which to fix certain genera." This is a curious way of denoting the fixing point of binomial nomenclature.

p. 116: "Among his (Linnaeus') students were . . . possibly Fallen." Fallén was 14 years old when Linnaeus died.

p. 117: Finland. Three lines on Peter Kalm and two on E. E. Bergroth is all that is told about the country of J. R. Sahlberg, John Sahlberg, the two Reuters, Mannerheim, J. A. Palmén, Saalas, Krogerus, Linnaniemi, Frey, and a lot of younger, very fine entomologists.

p. 48: A purely entomological statement: "Protura . . . have antennae, six legs and a pair of terminal appendages." They have no antennae, twelve legs (three pairs of abdominal appendages) and no terminal appendages.

All the "probably" and "presumably" and "I do not know" might have been checked by means of a postcard. Only once this is tried, and this is the reason why the entomology of Brazil is so extensively stated—as extensively as it should have been for all countries.

About 50 per cent of the names of foreign entomologists, localities or titles are misspelled.

Writing history is a science demanding special ability and must not be confused with writing memoirs. It is a pity when this happens. Somebody ought to have helped the author by checking his statements or advising him to confine himself to his personal memoirs. As it is I am most unfortunately forced to warn against the use of statements from this book the heading of which entitles it to so great an interest.

S. L. Tuxen
Zoological Museum, Copenhagen

A new name for Phytomyza subpusilla Frost (Diptera)

By S. W. Frost, State College, Pa.

Phytomyza subpusilla Frost was described in The Journal of the New York Entomological Society, Vol. 41: 254–266, 1943, as a miner on the leaves of certain Cruciferae and Compositae, nasturtium, plantain and fern. It appears that *subpusilla* Frost is a primary homonym of Mallock's Formosan species published in 1914. The writer therefore proposes a new name **propepusilla,** placing the species in the genus **Liriomyza** according to the classification of European workers.

Dicymolomia julianalis Walker (Lepidoptera: Pyralidae) and its Ichneumonid Parasite, Cremastus gracilipes Cushman, Reared from Typha latifolia at London, Ontario

By W. W. Judd, University of Western Ontario, London, Ontario

On June 1, 1952, heads of cat-tail, *Typha latifolia,* were examined for the presence of insects, in a swamp adjacent to the north-west corner of Huron and William Streets in London, Ontario. Heads infested with larvae of *Dicymolomia julianalis* Walker were on dead plants of the previous year's growth and were recognizable by their considerably fluffed out appearance caused by the loosening of the flowers from the rachis by the activity of the larvae. Claassen [1] says of these infested heads that "the seeds are kept from scattering by being tied together with silk woven by the larvae. Neither wind nor rain is able to tear apart the heads so protected. Accordingly they form a good shelter for the larvae during the winter." He reports that typically the larvae bore in and pupate in the rachis of the head

[1] Claassen, P. W. 1921. Cornell Univ. Agric. Exp. Stn. Mem. 47.

but that many remain in the fluffy material in the heads to spin their cocoons and pupate. Cole [2] also refers to *D. julianalis* as being an inhabitant of *Typha latifolia*.

One hundred of the infested heads from the swamp at London were snapped from their stalks and were examined for the presence of larvae. The rachis was pulled out of each head and the felty mass of the head could then be unrolled, revealing the insects within. Of the one hundred heads examined 66 contained one larva, 27 contained two larvae, 4 contained three larvae, 1 contained four larvae and 2 contained one pupa each. The presence of two pupae in the large collection of larvae on June 1 is in accord with the statement of Claassen that "pupation begins about the first of June."

Forty-one of the larvae were preserved in fluid and the remaining larvae and the two pupae were placed in glass jars with ravelled heads of the cat-tail, for rearing. The length of each of the preserved larvae was measured, under a binocular microscope, by means of a scale graduated to 0.1 mm. The lengths varied from 6.0 to 13.5 mm. with an average of 9.9 mm., indicating that many of them were considerably longer than those studied by Claassen who records that full-grown larvae are from 7 to 10 mm. long. The coloration of the larvae corresponded with Claassen's description.

The mass of ravelled heads in jars was examined daily for the appearance of the emerging moths. Between June 17 and July 3 fifteen moths emerged. Claassen reports that "adults emerge during the latter part of June and the first part of July." The moths were identified as *Dicymolomia julianalis* Walker by Mr. H. W. Capps of the U. S. National Museum, one of the specimens being deposited in the collections of that institution and the others in the collection of the University of Western Ontario. No further specimens emerged by July 13, when the material was discarded. On June 19 a single ichneumonid wasp emerged and was identified as *Cremastus gracilipes* by Dr. L. M. Walkley of the U. S. National Museum, the specimen being deposited in the collection of that institution. This species was described by

[2] Cole, A. C. 1931. Ent. News 42: 6, 35.

Cushman,[3] the type-host being *D. julianalis*. Cushman [4] also records later rearings of this wasp from the same host.

Current Entomological Literature

Compiled by VENIA T. PHILLIPS, Librarian

Academy of Natural Sciences of Philadelphia

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania pertaining to entomology, including all arthropods except Crustacea. Coverage will be world-wide as regards major contributions to systematics as well as for all papers on morphology, physiology, embryology, etc. In addition, for species from the Americas and the Pacific (Nearctic, Neotropical and Polynesian regions) all minor contributions to taxonomy, distribution, etc., will also be recorded.

This list gives references of the year 1953 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Birch, L. C.—Experimental background to the study of the distribution and abundance of insects. I. The influence of temperature, moisture and food on the innate capacity for increase of three grain beetles. [50] 34: 698–711. **Bonnet, P.**—Mise au point sur la lettre initiale des noms spécifiques de personnes. [138] 58: 113–24. **Britt, N. W.**—Differences between measurements of living and preserved aquatic nymphs caused by injury and preservation. (Ephemera.) [50] 34: 802–03. **Hayward, K. J.**—An entomologist in Argentina. II. Buenos Aires and La Rioja. [Ent. Record] 65: 310–15. **Hinton, H. E.**—Some adaptations of insects to environments that are alternately dry and flooded, with some notes on the habits of the Stratiomyidae. [143] 11: 209–27, ill. **Kellen, W. R.**—A quantitative sampler for aquatic insects. [76] 46: 913–14. **Kiriakoff, S. G.**—Zoogéographie et phylogénie. [136] 89: 126–34. **Knowlton, G. F.**—Utah insect notes. [36] 48: 125–28. **Kullenberg, B.**—Nouvelles observations sur les

[3] CUSHMAN, R. A. 1917. Proc. U. S. Nat. Mus. 53: 503.

[4] CUSHMAN, R. A. 1930. Proc. U. S. Nat. Mus. 76: 1.

rapports entre Ophrys et les insectes. [Bull. Soc. Sci. Nat. Maroc] 32: 175–79. **Lindroth, C. H.**—Some attempts toward experimental zoogeography. (Carabidae.) [50] 34: 657–66, ill. **Medler, J. T. & A. R. Albert.**—The relationship between populations of alfalfa insects and soil treatments with boron. [76] 46: 793–97. **Müller, H. J.**—Der blattlaus-befallsflug im bereich eines ackerbohen- und eines kartoffelbestandes. [28] 3: 229–58, ill. **Murgatroyd, J. H. & G. J. Kerrich.**—Eighth Congress of British entomologists, Leeds, 10th–13th July, 1953. (Including group picture.) [142] 4: 145–58, ill. **Rawson, D. S.**—The bottom fauna of Great Slave Lake. [Jour. Fish. Res. Bd. Canada] 10: 486–520. (Insects, p. 495–97.) **Rendtorff, R. C.**—A method of exposing flies to infectious material. [80] 39: 672–73, ill. **Robinson, H. S.**—Mercury-vapour lamp technicalities. [Ent. Gaz.] 4: 280–81. **Rolston, L. H. & F. D. Miner.**—A new pinning unit. [82] 26: 146–47, ill. **Ullyett, G. C.**—Biomathematics and insect population problems. A critical review. [Memoirs, Ent. Soc. Southern Africa] no. 2, 89 pp., ill.

BIOGRAPHIES, OBITUARIES—Barr, Charles M., 1919–1952.—Obituary with short biography, by G. B. Vogt. [47] 7: 52–55. **Burgess, Albert Franklin,** 1873–1953.—Obituary, with portrait, by A. I. Bourne. [76] 46: 918–20. **Eldik, Henri Charles Louis van,** 1890–1953.—In memoriam, by M. Hardonk. [57] 14: 389–90. Port. **Hyslop, James Augustus,** 1884–1953.—Obituary, with portrait, by H. Sollers. [76] 46: 920–21. **Jordan, Karl H. C.,** 1888– .—Commemoration of his 65th birthday, by H. Sachtleben. [28] 3: 357–58, port.

ANATOMY, PHYSIOLOGY, MEDICAL—Acree, F., Jr.—Studies on the chromatography of gyptyl azoate. (Porthetria dispar.) [76] 46: 900–02. **Bauers, C.**—Ueber die orientierung wirbelloser tiere zum licht. [159] 64: 348–90. **Blanton, F. S.**—Toxicity of several new organic insecticides to body lice (Pediculus humanus corporis DeG.). Pt. 1. [101] 61: 169–80. **Brauns, A.**—Beiträge zur ökologie und wirtschaftlichen bedeutung der aphidivoren syrphidenarten. [28] 3: 278–303, ill. **Buck, J. B. & M. L. Keister.**—Cutaneous and tracheal respiration in the Phormia larva. [30] 105: 402–11. **DeCoursey, J. D., A. P. Webster & others.**—An antibacterial agent from Tribolium castaneum (Herbst). [52] 46: 386–92. **& R. S. Leopold.**—Studies on the effect of insecticides on the oviposition of

Anopheles quadrimaculatus Say. [52] 46: 359–65, ill. **Fraenkel, G. & V. J. Brookes.**—The process by which the puparia of many species of flies become fixed to the substrate. [30] 105: 442–49. **Franklin, W. W.**—The effects of Nosema apis on package and overwintered honeybee colonies used for alfalfa pollination. [76] 46: 780–85. **Gersch, M.**—Ueber die ausscheidung von farbstoffen bei der reblaus (Homop.). [160] 151: 225–36. **Ghelelovitch, S.**—Influence de la température sur le développement d'une tumeur héréditaire chez la drosophile (Drosophila melanogaster Meig.). [2] 237: 1445–47. **Gösswald, K. & K. Bier** —Untersuchungen zur kastendetermination in der gattung Formica. [160] 151: 126–34. **Hafez, M.**—On the behavior and sensory physiology of the house fly larva, Musca domestica L. II. Prepupating stage. [78] 124: 199–225. **Harnisch, O.**—Die rolle der analpapillen beim wasserwechsel der larva von Chironomus plumosus. [100] 40: 537. **Hopp, H.-H.**—Histologische veränderungen in den organen der kleiderlaus (Pediculus vestimenti N.) unter der einwirkung vom insektiziden. [159] 64: 267–72. **Iyengar, R.**—Un nouveau mode d'alimentation chez la larve d'Anopheles turkhudi et les caractères morphologiques particuliers à cette larve. [2] 237: 1449–51, ill. **Jakovlev, V. & F. Krüger.**—Vergleichende untersuchungen zur physiologie der transpiration der orthopteren. [159] 64: 391–428. **Jones, J. C.**—On the heart in relation to circulation of hemocytes in insects. [52] 46: 366–72, ill. **Jordan, K. H. C.**—Wachsdrüsen bei Odontoscelis, sowie ein beitrag zur biologie dieser gattung (Hemip., Pentatom.) [160] 151: 186–92. **Kartman, L.**—Comparative susceptibility of Anopheles quadrimaculatus "strains" to domestic Plasmodium vivax. [80] 39: 668–69. —A correlation of malphigian tubule size with development of Dirofilaria immitis in the mosquito. [80] 39: 671–72. **Keister, M. L.**—Some observations on pupal respiration in Phormia regina. [79] 93: 573–87, ill. **Krishna, D.**—The lipoid contents of the Golgi bodies in the oocytes of the Indian water spider, Lycosa birmanica. [116] 94: 315–18, ill. **Legendre, R.**— Le système sympathique stomacogastrique ("organe de Schneider") des araignées du genre Tegenaria. [2] 237: 1283–85. **Ludwig, D. & A. J. Bartolotta.**—The effect of DDT on the composition of larval blood of the Japanese beetle (Popilla japonica Newman). [101] 61: 119–25. **McElroy, W. D., J. W. Hastings, J. Coulombre & V. Som-**

nenfeld.—The mechanism of action of pyrophosphate in firefly luminescence. [Arch. Biochem. Biophys.] 46: 399–416. **Mistric, W. J. & C. F. Rainwater.**—Further studies of the action of insecticides on cotton insects. [76] 46: 838–44. **Munson, S. C. & M. I. Gottlier.**—The differences between male and female American roaches in total lipid content and in susceptibility to DDT. [76] 46: 798–802. **Nüesch, H.**—The morphology of the thorax of Telea polyphemus. I. Skeleton and muscles. [79] 93: 589–609, ill. **Ostlund, E.**—Adrenaline, noradrenaline and hydroxytyramine in extracts from insects. [98] 172: 1042–43, ill. **Pérez-Reyes, R.**—Anopheles aztecus (Hoffman, 1935) a new definitive host for the cyclical transmission of Plasmodium berghei Vincke and Lips, 1948. [80] 39: 603–04. **Poisson, R. & P. Razet.**—Recherches sur la dégradation de l'acide urique chez les hemiptères aquatiques. [2] 237: 1362–63. **Pratt, J. J. & F. H. Babers.**—The resistance of insects to insecticides. Some differences between strains of house flies. [76] 46: 864–69. **Quentin, R. M.**—L'anophtalmie des scaritides. Note préliminaire (Caraboidea). [138] 58: 107–09, ill. **Reimann, K.**—Untersuchungen an der thoraxdrüse der arbeiterin von Apis mellifica. [100] 40: 538. **Rietschel, P.**—Die balgengelenke der durch blutdruck beweglichen gelenke bei Lamellicorniern. [160] 151: 166–74. **Roan, C. C. & S. Maeda.**—The cholinesterase of the oriental fruit fly and its in vitro reactions with various insecticidal compounds. [76] 46: 775–79. **Shafiq, S. A.**—Cytological studies of the neurones of Locusta migratoria Part I. Cytoplasmic inclusions of the motor neurones of the adult. [116] 94: 319, ill. **Sinha, R. N.**—The spermatheca in the flour beetle (Tribolium castaneum Herbst). [101] 61: 131–34, ill. **Steiner, G.**—Zur duftorientierung fliegender insekten. [100] 40: 514–15. **Sturtevant, A. P. & I. L. Revell.**—Reduction of Bacillus larvae spores in liquid food of honey bees by action of the honey stopper, and its relation to the development of American foulbrood. [76] 46: 855–60. **Tahori, A. S. & W. M. Hoskins.**—The absorption, distribution and metabolism of DDT in DDT-resistant house flies. [76] 46: 829–37. **Vachon, M.**—Commentaires a propos de la distinction des stades et des phases du développement post-embryonnaire chez les araignées. [Bull. Mus. Nat. d'Hist. Nat. Paris] 25: 294–97. **Verron, H.**—Sur la possibilité d'un apprentissage latent chez Blatella germanica. [2] 237: 1442–43. **Voy, A.**—

La production par "régénération directe" des tarses hypotypiques et des tarses pentamères au cours du développement post-embryonnaire chez le phasme femelle (Carausius morosus Br.). [2] 237: 1451–54.

ARACHNIDA AND MYRIOPODA—Baker, E. W. & A. E. Pritchard.—A review of the false spider mite genus Tenuipalpus Donnadieu (Acarina: Phytoptipalpidae). [52] 46: 317–36, ill. (*k). **Feldman-Muhsam, B.**—The identity of Rhipicephalus sanguineus in the U. S. A. (Acarina.) [80] 39: 670. **Goodnight, C. J. & M. L.**—Taxonomic recognition of variation in Opiliones. [146] 2: 173–79, 192, ill. **Hoffman, R. L.**—A new Central American milliped of the genus Platyrhacus (Polydesmida, Platyrhacidae). [56] 55: 251–58 (*). **Jayewickreme, S. H. & P. Antonipulle.**—On the feeding habits of an adult trombidiid mite in nature. [46] 25: 157–60. **Kohls, G. M. & A. J. Rogers.**—Note on the occurrence of the tick Ixodes affinic Neumann in the United States. [80] 39: 669. **Legendre, R.**—(See Anatomy.) **Rasmont, R.**—Myologie abdominale d'une theraphoside et d'une dipluride. (Araignees Mygalomorphes.) [Annales Soc. Roy. Zool. Belg.] 83: 225–42, ill., 1952. **Vachon, M.**—(See Anatomy.)

SMALLER ORDERS—Britt, N. W.—Ephemera. (See General.) **Carriker, M. A., Jr.**—Studies in neotropical Mallophaga. XII. Part I. Lice of the tinamous. [117] 13: 209–24. **Chao, H.-F.**—The external morphology of the dragonfly Onychogomphus ardens Needham. [131] 122: no. 6, 56 pp., ill. **Emerson, K. C.**—New North American Mallophaga. [82] 26: 132–36, ill. —A new species of Carduiceps (Mallophaga, Philopteridae). [56] 55: 209–11, ill. **Gösswald, K.**—Der termitenstaat. [Kosmos, Stuttgart] 50: 59–64, ill. **Jellison, W. L., B. Locker & R. Bacon.**—A synopsis of North American fleas, north of Mexico, and notice of a supplementary index. [80] 39: 610–18. **Moore, N. W.**—Population density in adult dragonflies (Odonata-Anisoptera). [74] 22: 344–59, ill. **Morlan, H. B.**—Meringis rectus (Siphonaptera, Hystrichopsyllidae), a new ectoparasite of Kangaroo rats. [80] 39: 605–09, ill. **Poole, V. V. & R. A. Underhill.**—Biology and life history of Megabothris clantoni clantoni (Siphonaptera: Dolichopsyllidae). [Publ. Walla Walla Coll., Dept. Biol.] no. 9, 19 pp., ill. **Racenis, J.**—Records of Venezuelan Odonata, with a description of a new species. [108] 18: 180–89, ill. **St. Quentin, D.**—Der fangapparat der Odonaten. [104] 4:

375–90, ill. **Smit, F. G. A. M.**—Monstrosities in Siphonaptera IV. More cases of castration. [57] 14: 393–400, ill. **Sturm, R.**—Notes on some Siphonaptera of Fulton County, New York. [101] 61: 139–40. **Tuleshkov, Kr. N.**—Pukhoiadi (Mallophaga) ektoparaziti po domashnite zhivotni v Bulgariia. (French summary.) [Bulgar. Akad. Naukite, Zool. Inst. Izvest] 2: 75–161, ill. **Ward, R. A.**—Additional record of phoresy of Mallophaga on Hippoboscidae. [36] 48: 128.

ORTHOPTERA—Dirsh, V. M. & B. P. Uvarov.—Preliminary diagnoses of new genera and new synonymy in Acrididae. [149] 96: 231–37. **Jakovlev & Krüger.**—(See Anatomy.) **Verron, H.**—(See Anatomy.) **Voy, A.**—(See Anatomy.)

HEMIPTERA—Barber, H. G.—A revision of the genus Kleidocerys Stephens in the United States (Lygaeidae). [56] 55: 273–83 (*k). **Boratyński, K. L.**—Sexual dimorphism in the second instar of some Diaspididae (Coccoidea). [126] 104: 451–79, ill. **Boyd, W. M.**—Holly scale Asterolecanium puteanum Russell, in New Jersey. [101] 61: 168. **Carvalho, J. C. M.**—Neotropical Miridae, LXVI. New species of Clivinemini. [117] 13: 265–70. **& R. I. Sailer.**—Neotropical Miridae, XLVII—The genus Ofellus Distant, 1883, with descriptions of three new species. [56] 55: 234–38, ill. (k). **Cobben, R. H.**—Bemerkungen zur lebensweise einiger höllandischen wanzen. [149] 96: 169–98, ill. **Cook, P. P. Jr.**—New distribution records for Membracidae. [82] 26: 145. **Creutz, G.**—Heteropteren als vogelnahrung. [28] 3: 411–19. **Drake, C. J.**—A new genus and new species of Tingidae. [31] 66: 211–23. **Eastop, V. F.**—A study of the Tramini (Aphididae). [126] 104: 385–413, ill. **Elkins, J. C.**—Notes on some Texas Reduviidae. [82] 26: 137–40. **Förster, H.**—Über die ernährungsweise von Aradus depressus F. (Aradidae). [28] 3: 395–404. **Frommhold, E.**—Rhynchoten als froschnahrung. [28] 3: 419–23. **Hottes, F. C. & E. O. Essig.**—Four new species of Cinara (Aphidae). [31] 66: 205–10, ill. **Jordan, K. H. C.**—(See Anatomy.) **Leston, D.**—On the wing-venation, male genitalia and spermatheca of Podops inuncta (F.), with a note on the diagnosis of the subfamily Podopinae Dallas (Pentatomidae). [142] 4: 129–35, ill. **Petzsch, H.**—Cimex lectularius L. als parasit verschiedener warmblütiger zoo-tiere, insbesondere von gehaltenen kleinsäugetieren. [28] 3: 404–05. **Poisson & Razet.**—(See Anatomy.) **Schiemenz, H.**—Zum farb-

wechsel bei heimischen heteropteren unter besonderer berücksichtigung von Palomena Muls. & Rey. [28] 3: 359–71, ill. **Southwood, T. R. E.**—The morphology and taxonomy of the genus Orthotylus Fieber (Miridae), with special reference to the British species. [126] 104: 415–49, ill. **Ullrich, W.**—Beobachtung zur frage der schutztracht der feuerwanze, Pyrrhocoris apterua L. (Pyrrochoridae). [28] 3: 406–11. **Weiss, H. B.**—The periodical Cicada in New Jersey in 1953. [101] 61: 159–61.

LEPIDOPTERA—Koch, M.—Zur biologie des kiefern-prozessions-spinners, Thaumatopoea pinivora Tr. [28] 3: 423–27. **Maturo, F. J. S., Jr.**—Range extension of Rhopalocera in eastern North Carolina, a checklist of the species of Carteret County, N. C. [Jour. Elisha Mitchell Sci. Soc.] 69: 150–55. **Nüesch, H.**—(See Anatomy.) **Oiticica Filho, J.**—Nota sôbre a fêmea de Bathyphlebia eminens (Dognin, 1891) (Citheron.). [117] 13: 271–74. **Rindge, F. H.**—Synonymic notes on North American Geometridae. [101] 61: 141–42.

DIPTERA—Alexander, C. P.—Records and descriptions of neotropical crane-flies (Tipulidae), XXVII. [101] 61: 147–57. **Berg, C. O.**—Sciomyzid larvae that feed on snails. [80] 39: 630–36. **Bozhkov, D.**—Mogat li larvite na Anopheles maculipennis da iziazhdat iaitsa ot s'schchiia vid? (French summary.) [Bulgar. Akad. Naukite, Zool. Inst., Izvest.] 2: 163–88. **Brauns, A.**—(See Anatomy.) **Fairchild, G. B.**—Arboreal Tabanidae in Panama. [56] 55: 239–43. **& M. Hertig.**—Notes on the Phlebotomus of Panama (Psychodidae). XI. The male of P. cruciatus Coq. and notes on related species. [52] 46: 373–85, ill. **Fluke, C. L.**—New Syrphidae from North America. [82] 26: 125–29, ill. **Fraenkel & Brookes.**—(See Anatomy.) **Ghelelovitch, S.**—(See Anatomy.) **Grundmann, A. W. & J. M. Butler.**—Dipterous larvae infesting the intestinal tract of the coyote, Canis latrans Say 1823. [82] 26: 129–31. **Hafez, M.**—(See Anatomy.) **Hinton, H. E.**—(See General.) **Iyengar, R.**—(See Anatomy.) **Jaeger, C. P. & F. M. Salzano.**—Drosophila gaucha, a new species from Brasil. [117] 13: 205–07. **Kartman, L.**—(See Anatomy.) **Keister, M. L.**—(See Anatomy.) **Lopes, H. de Souza.**—Sôbre Rafaela Townsend e Sarcodexia Townsend (Sarcoph.). [117] 13: 225–33. **Malogolowkin, C.**—Sôbre e genitália dos Drosofilídeos. IV. A genitália masculina no subgênero Drosophila. [117] 13: 245–64. **Martinez Pala-**

cios, A.—Culex inflictus Theobald y Culex thriambus Dyar, Mosquitos neuvos para Mexico. [134] 13: 89–95, ill., 1952. **Martinez Palacios, A.**—Nota sobre la distribucion de los mosquitos Culex en Mexico. [134] 13: 75–87, 1952. **& L. Vargas.**—Confirmacion de la presencia de Anopheles (Kerteszia) neivai H. D. & K. 1917, en Mexico. [134] 13: 45–6, 1952. **Oliveira, S. J. de.**—Sôbre a presenca do gênero Clinotanypus Kieffer, 1913, na região neotrópica com a descrição de duas espécies novas (Chironom.). [117] 13: 275–82. **Pérez-Reyes, R.**—(See Anatomy.) **Philip, C. B.** —The genus Chrysozona Meigen in North America (Tabanidae). [56] 55: 247–51 (*k). **Reinhard, H. J.**—Notes on muscoid synonymy with descriptions of three new species. [56] 55: 243–47. **Schremmer, F.**—Die bisher unbekannte larva von Lasiopa villosa Fabr. (Stratiom.). [104] 4: 363–74, ill. **Seago, J. M.**—A new species of Fannia from North America (Muscidae). [82] 26: 141–42. **Séguy, E.**—Un lycoriide nouveau du Groenland. [Ency. Ent. Ser. B, II] 11: 118. **Simkover, H. G.**—Rhagoletis cingulata on wild and cultivated cherries in eastern Washington. [76] 46: 869–97. **Sommerman, K. M.**—Identification of Alaskan black fly larvae (Simuliidae). [56] 55: 258–73, ill. (k). **Sorenson, J. S. & C. L. Fluke.**—The male genitalia of the Stratiomyidae with special reference to Wisconsin species. [52] 46: 337–42, ill. (k). **Stahler, N. & L. A. Terzian.**—Studies in the laboratory mating habits of Anopheles quadrimaculatus Say. [78] 124: 317–28. **Stalker, H. G.**—Taxonomy and hybridization in the cardini group of Drosophila. [52] 46: 343–58, ill. (*k). **Sudia, W. D. & R. H. Gogel.**—The occurrence of Orthopodomyia alba Baker in Georgia (Culicidae). [36] 48: 129–31. **Tashiro, H. & H. H. Schwardt.**—Biological studies of horse flies in New York. [76] 46: 813–22. **Vargas, L.**—Dos nuevas especies mexicanas de Corethrella (Culicidae). [134] 13: 57–62, ill., 1952. —Tendipes (Limnochironomus) californicus y Tendipes (Limnochironomus) figueroai n. sp. (Tendipedidae). [134] 13: 47–51, ill., 1952. **& A. Diaz Najera.**—Descripcion de la larva de Cnephia aguirrei (Dalmat, 1949). (Simuliidae.) [134] 13: 53–6, ill., 1952. —Dos flebotomos nuevos de Mexico (Psychodidae). [134] 13: 63–74, ill., 1952. **Wanson, M.**—Le problème des moustiques anversois. [Annales Soc. Roy. Zool. Belg.] 83: 339–69, 1952. **Williams, R. W.** —Notes on the bionomics of the Alluaudomyia of Baker County, Georgia. I. Observations on breeding habitats of bella and needhami. (Heleidae.) [56] 55: 283–85.

COLEOPTERA—Becker, E. C. & M. W. Sanderson.—Honduras Pselaphidae. [52] 46: 399–432, ill. (*k). **Beckwith, L. C.**—Collection of European elm bark beetles in Wisconsin. [76] 46: 913. **Birch, L. C.**—(See General.) **Bosq, J. M. & A. Ruffinelli.**—Notas para el catalogo de los cerambicidos del Uruguay. [Comunic. Zool., Museo Hist. Nat. Montevideo] 3: no. 62, 32 pp., 1949/51. **Gressitt, J. L.**—The coconut rhinoceros beetle (Oryctes rhinoceros) with particular reference to the Palau Islands. [Bull. Bern. P. Bishop Mus.] 212, 157 pp., ill. **Guignot, F.**—Description d'un Gyretes du Venezuela. [Memoire Mus. Civ. Stor. Nat. Verona] 3: 205, 1951/52. **Lindroth, C. H.**—(See General.) **Machatschke, J. W.**—Zur variabilität von Leptinotarsa decemlineata Say. [28] 3: 304–11, ill. **Malkin, B.**—Western records of Silpha surinamensis. [47] 7: 50–51. **Monrós, F.**—Some corrections in the nomenclature of Clytrinae (Chrysomelidae). [47] 7: 45–50. **Pic, M.**—Neue cleriden aus der sammlung des Deutschen Entomologischen Instituts. [28] 3: 320–22 (S). **Sanderson, M. W.**—A revision of the nearctic genera of Elmidae. [82] 26: 148–63, ill. (k). **Schilder, F. A.**—Nomenklatorische notizen zu Cicindela. [28] 3: 312–19. **Straneo, S. L.**—Nuovi Pterostichini VII. (Carabidae). [Doriana, Suppl. Ann. Mus. Civ. Stor. Nat.] 1, no. 36, 12 pp., ill. (S). **Tuttle, D. M.**—Notes on Listronotus debilis Blatchley (Curculionidae). [36] 48: 123–24. **Young, F. N.**—A new Hydroporus from Michigan, with notes on other members of the Hydroporus vilis group (Dytiscidae). [36] 48: 116–22, ill.

HYMENOPTERA—Balthasar, V.—Monographie des chrysidides de Palestine et des pays limitrophes. [Acta Ent. Mus. Nat. Prague] 27, suppl. 2, 317 pp., ill., 1951. **Evans, H. E.**—Comparative ethology and the systematics of spider wasps. (Pompilidae). [146] 2: 155–72, ill. **Gösswald & Bier.**—(See Anatomy.) **Krombein, K. V.**—A note on the nesting behavior and prey of Agenioideus (Agenioideus) humilis (Cresson) (Pompilidae). [36] 48: 113–15. **Smith, M. R.**—Dolichoderus granulatus Pergande, a synonym (Formicidae). [56] 55: 211. —A new Pheidole (Subg. Ceratopheidole) from Utah (Formicidae). [101] 61: 143–46, ill. —Pogonomyrmex salinus Olsen, a synonym of Pogonomyrmex occidentalis (Cress.) (Formicidae). [36] 48: 131–32. **Snelling, R. R.**—Notes on the hibernation and nesting of the wasp Mischocyttarus flavitarsis (De Saussure) (Vespidae). [82] 26: 143–45.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

American Sarcophagidae—wanted for identification. H. R. Dodge, P.O. Box 185, Chamblee, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzlar 16, Germany.

For exchange—The periodic Cicada, T. septendecim. Desire Lepid., espec. Papil., Sphing. & Speyeria. Also Col., espec. Ceramb. & Lucan. John W. Morris, 2704 Genesee St., Syracuse 9, N. Y.

Cynipid and Itonidid galls—American species wanted; purchase or exchange for British species. Fresh or dried. D. Leatherdale, F.R.E.S., Old Woodstock, Oxford, England.

Wanted—Reprints or papers concerning insects taken in Alaska for inclusion in list of Alaskan insects. R. H. Washburn, Alaska Experiment Station, Palmer, Alaska.

Conopidae of the World wanted. Will pay 10¢ to $1.00 for pinned and labelled specimens. S. Camras, 4407 N. Milwaukee Ave., Chicago 30, Illinois.

Anisoptera—Nearctic sp. wanted for exchange, espec. Ophiog., Arigom., Aeschna, Neurocor., Somatoc., Cordulia, Dorocor., Leucor. R. D. Cuyler, Dept. of Entomology, N. C. State College, Raleigh, N. C.

Bembicini and Stizini (Hym., Sphec.) of New World wanted for revis. study. Will return upon request or at end of project. James E. Gillaspy, Dept. of Zoology, Univ. Texas, Austin 12, Texas.

Agapema galbina. Will exchange cocoons of this moth for nature books. E. Frizzell, Route 4, Box 96, San Benito, Texas.

Wanted—Data on exact location of colonies of *Epibembex* (olim *Bembix*) (Hymenoptera), any species, any part of country, for biological studies. Howard E. Evans, Dept. Entomology, Cornell Univ., Ithaca, N. Y.

Entomological Equipment and Literature

Tight-fitting, light weight Paulownia-wood insect boxes, cork-lined; ideal for private collections, travel or mailing boxes: 8½ x 12″, $1.00 plus postage and packing; also smaller sizes.

Medium weight pinning forceps, $.80; fine, straight, 5″ forceps, $.45; 10 × hand lens, $1.00; also glass-ware, vials, corks, sheet-cork, unit trays, etc. Payment in U. S. check or money-order. Write us your needs in equipment or literature.

R. Iso, 141, 1-chome, Shimouma, Setagaya-Ku, Tokyo, Japan

For Your Collecting Needs . . .

BUY THE *KNOWN* BEST!

WARD'S equipment can be relied on to be of *tested* value to you. Because WARD'S has long set the standard of entomological supply, you may depend on the quality of the aids available for *all* your needs. Send for free catalog of Entomological Supplies and Equipment to *Department E 12.*

WARD'S **Natural Science Establishment, Inc.**
Serving the Natural Sciences Since 1862
3000 Ridge Road East • Rochester 9, New York

Important Mosquito Works

MOSQUITO ATLAS. Part I. The Nearctic Anopheles, important malarial vectors of the Americas, and Aedes aegypti and Culex quinquefasciata

MOSQUITO ATLAS. Part II. The more important malaria vectors of the Old World: Europe, Asia, Africa and South Pacific region

By Edward S. Ross and H. Radclyffe Roberts

Price, 60 cents each (U. S. Currency) with order, postpaid within the United States; 65 cents, foreign.

KEYS TO THE ANOPHELINE MOSQUITOES OF THE WORLD

With notes on their Identification, Distribution, Biology and Relation to Malaria. By Paul F. Russell, Lloyd E. Rozeboom and Alan Stone

Mailed on receipt of price, $2.00 U. S. Currency. Foreign Delivery $2.10.

For sale by the American Entomological Society, 1900 Race Street, Philadelphia 3, Pa., U. S. A.

MEMOIRS OF THE AMERICAN ENTOMOLOGICAL SOCIETY

The Society offers for sale the 14 numbers of this important and steadily growing series of longer monographic works, all numbers of which are still in stock.

1.—Cresson (Ezra T.)—The Cresson Types of Hymenoptera (141 pp., 1916) ..... $ 3.00

2. —Hebard (Morgan)—The Blattidae of North America, North of the Mexican Boundary (284 pp., 10 pls., 1917) 5.50

3.—Munz (Philip A.)—A Venational Study of the Suborder Zygoptera (Odonata), with Keys for the Identification of Genera (78 pp., 20 pls., 1919) 2.00

4.—Hebard (Morgan)—The Blattidae of Panama (148 pp., 60 pls., 1920) 3.00

5.—Cresson (Ezra T.)—The Type of Hymenoptera in the Academy of Natural Sciences of Philadelphia other than those of Ezra T. Cresson (90 pp., 1928) 2.00

6.—Rivnay (Ezekiel)—Revision of the Rhipiphoridae of North and Central America (Coleoptera) (68 pp., 4 pls., 1929) 2.00

7.—Leonard (Mortimer D.)—A Revision of the Dipterous Family Rhagionidae (Leptidae) in the United States and Canada (182 pp., 3 pls., 1930) 4.50

8.—Rehn (James A. G. and Rehn, John W. H.)—The Eumastacinae of southern Mexico and Central America (84 pp., 6 pls., 1934) .. 2.50

9.—Pate (V. S. L.)—The Generic Names of the Sphecoid Wasps and their type species (103 pp., 1937) 2.50

10.—Huckett (H. C.)—A Revision of the North American species belonging to the genus Pegomyia (131 pp., 9 pls., 1941) 3.00

11.—Townes (Henry K., Jr.)—Catalogue and reclassification of The Nearctic Ichneumonidae (925 pp., 1944) 15.00

12.—Phillips (Venia Tarris)—The Biology and Identification of Trypetid Larvae (161 pp., 16 pls., 1946) 5.00

13.—Braun (Annette F.)—Elachistidae of North America (Microlepidoptera) (110 pp., 26 pls., 1948) 4.50

14.—Rehn (John W. H.)—Classification of the Blattaria as indicated by their Wings (134 pp., 13 pls., 1951) 5.00

THE AMERICAN ENTOMOLOGICAL SOCIETY

1900 RACE STREET, PHILADELPHIA 3, PA.